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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,551	02/06/2007	Wouter Detlof Berggren	TS1481 US	2312

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EXAMINER	
MERKLING, MATTHEW J	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
02/02/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/552,551	BERGGREN ET AL.	
	Examiner	Art Unit	
	MATTHEW J. MERKLING	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/12/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Status

1. In a phone call with Craig Lundell on 1/26/2010, the examiner confirmed that claims 7 and 8 should be cancelled in the preliminary amendment dated 10/12/05.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2 and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuderer (US 4,650,651).

Regarding claims 1 and 6, Fuderer discloses a process for the preparation of a gas containing hydrogen and carbon monoxide (see abstract) from a carbonaceous feedstock, the process comprising:

(a) partially oxidizing a carbonaceous feedstock (see col. 6 lines 21-28 which discloses that oxygen and a hydrocarbon feed are partially combusted in reaction zone 9) in a vertically oriented tubular partial oxidation reactor vessel (see Figure) having an upper end (top of reaction zone), and a lower end having an inlet (lower end is the exit of the conduit 8), the vessel comprising a burner at the upper end (as discussed above, to partially combust the feed hydrocarbon) thereby obtaining a first gaseous product of hydrogen and carbon monoxide (due to partial combustion, see reaction 3 in column 5 which takes place in reaction zone 9);

(b) catalytically steam reforming a carbonaceous feedstock (such as methane fed through conduit 11, see Figure) in the presence of steam (fed through conduit 2, see Figure) in a convective steam reformer zone thereby obtaining a steam reformer product (col. 5 lines 52-60);

(c) reducing the temperature of the first gaseous product by mixing the first gaseous product with the steam reformer product by feeding the steam reformer product into the said inlet yielding a first mixture (see col. 6 lines 30-36 which discloses that reaction mixture at the outlet of conduit 7, which is from the steam reformer, is mixed and the temperature of the reformer product rises which also means that the temperature of the first gaseous product is decreased);

(d) contacting the first mixture with a bed of reforming catalyst (8) positioned in the lower end of the partial oxidation reactor vessel just below the said inlet (see Figure) and obtaining a second mixture (at the exit of pellet bed 20); and

(e) providing heat for the convective steam reforming reaction zone in step (b) by convective heat exchange between the second mixture and the steam reformer reactor zone (see Figure where effluent from reforming zone 8 is heat exchanged with steam reforming zone 5) thereby obtaining a hydrogen and carbon monoxide containing gas having a reduced temperature.

Fuderer, however, does not explicitly disclose that the temperature of the first gaseous product is between 1100°C and 1500C, does not explicitly disclose that the temperature of the second mixture is between 950°C and 1100°C, and does not explicitly disclose that the temperature of the first gaseous product is reduced by between 300°C and 750°C.

However, the precise temperature of the first gaseous product, second gaseous product and the amount of cooling of said first gaseous product by introduction of the steam reformer product is not considered to confer patentability to the claims. As the amount of heat transferred to the endothermic reforming reaction taking place in the first reforming zone and the second reforming zone is variable that can be modified by adjusting the temperature at which the first gaseous product and second mixture are maintained as well as the temperature drop of the first gaseous product by introduction of the steam reformer product (see Fuderer, col. 9 line 47 – col. 10 line 2, which discloses that the temperature at which the partial combustion takes place has a direct effect on the amount of heat that is transferred to the endothermic steam reforming reactions), the precise temperature and temperature drops of these streams would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed temperature of the

first gaseous product and second mixture, as well as the temperature drop of the first gaseous product by introduction of the steam reformer product cannot be considered critical. Accordingly, one of ordinary, skill in the art at the time the invention was made would have optimized, by routine experimentation, the claimed temperature of the first gaseous product and second mixture, as well as the temperature drop of the first gaseous product by introduction of the steam reformer product in the process of Fuderer to obtain the desired heat transfer to the endothermic reforming reactions (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)). Since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (I*n re Aller*, 105 USPQ 223).

Regarding claim 2, Fuderer does not explicitly disclose the steam to carbon molar ratio of the feed to step (b) is between 0.5 and 0.9.

However, the precise steam to carbon ratio in the feed is not considered to confer patentability to the claims. As the amount of carbon deposition and acceptable amount of methane contained in the effluent are variables that can be modified by adjusting the steam to carbon ratio of the feed (see Fuderer col. 8 lines 47-53), the precise ratio would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed ratio cannot be considered critical. Accordingly, one of ordinary, skill in the art at the time the invention was made would have optimized, by routine experimentation, the ratio in the feed of Fuderer to obtain the desired amount of carbon deposition and acceptable amount of methane contained in the effluent (*In re Boesch*, 617 F.2d. 272, 205

USPQ 215 (CCPA 1980)). Since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (I*n re Aller*, 105 USPQ 223).

Regarding claim 4, Fuderer further discloses the content of methane in the steam reformer product is between 1 mol% and 10 mol% relative to the carbon present as hydrocarbon in the carbonaceous feed to step (b) (see col. 12 lines 25-32 which discloses uncoverted methane will comprise 2-3%).

Regarding claim 5, Fuderer does not explicitly disclose the methane conversion in step (d) is between 10 wt% and 50 wt%.

However, the methane conversion in step (d) is not considered to confer patentability to the claims. As the acceptable amount of methane released from the reforming system of Fuderer is variable that can be modified by adjusting the amount of methane converted in step (d) (see col. 8 lines 47-67), the precise conversion would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed conversion cannot be considered critical. Accordingly, one of ordinary, skill in the art at the time the invention was made would have optimized, by routine experimentation, the conversion in the process of Fuderer to obtain the desired acceptable remaining methane in the product gas (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)). Since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (I*n re Aller*, 105 USPQ 223).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795